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ON THE ACCURACY OF HISTORICAL INTERNATIONAL FOREIGN TRADE STATISTICS. MORGENSTERN REVISITED

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0. Introduction

Difficulties in relating quantitative data for different countries have long been recognized by statisticians, economists and other social scientists. Export and import statistics of partner countries are among the few sets of statistics in which essentially similar methods of compilation are used by different countries to measure the same event. Comparing statistics of two countries one can often find that for both total trade figures and individual commodities the quantity stated as having been exported by one country to another does not tally with the data of the importing country. This fact has been noticed even in very recent international foreign trade compilations (1). Many authors have considered it as a proof of unreliability of the whole set of foreign trade statistics. Oscar Morgenstern, for example, states that:

> "It will be seen that for pairs of individual countries correspondences are as a rule very poor, so it remains a puzzle how the aggregate could be better.."

and concludes:

> "Writers on all phases of foreign trade will have to assume the burden of proof that the figures on commodity movements are good enough to warrant the manipulation and the reasoning to which they are customarily subject" (2).

In this work we will argue that this inference is not necessarily correct. Pairwise comparison between countries really tests only the geographical assignment, which could be faulty because of causes of divergence that do

not affect the overall data (3). These errors would cancel each other out in total trade figures and therefore the aggregate data could be accurate and reliable.

We will support this statement with a simple test of accuracy based on a comparison between the total value of imports or exports (according to each country's statistics) with the sum of the same trade flows as registered by the partner countries' statistics (4). We will use the same data base employed by Morgenstern, for the years 1909-13, 1928 and 1935 (5). The results considerably strengthen the shaken trust in the reliability of data: values of our index are already rather good in 1909-13 and they show a further improvement after the war. Moreover, an important part of their dispersion is due to differences in trade flows composition.

As a necessary introduction to the test, in the first part of the paper we consider the actual degree of comparability of data, which depends mainly on the similarity of compilation criteria among countries. In principle, reliability does not require comparability, but only consistency with the adopted criteria. A consistent statistic may not be comparable with others: for instance, United Kingdom adopted until 1904 a method of recording origin and destination of goods that rendered country data almost not comparable (6).

I. The Debate

The discussion on the reliability and comparability of foreign trade statistics is very old. Its beginning can be traced back to the 1853 international statistical conference in Brussels[7], which already recommended the standardization of criteria for compiling statistics. Contributions came from authors of different profession and of various reasons of interest in the issue. Statements and opinions should be therefore accepted with caution[8]. It seems useful to distinguish two groups:

A.1) users of statistics, more worried on the accuracy or reliability of the data. In the last century statistics were widely referred to in domestic debates between free traders and protectionists and in international

negotiations for the renewal of trade treaties. Within this context many authors, from Bourne and Giffen[9] onward, raised the issue of their reliability. This tradition has been taken up again by those historians who have used the statistics themselves as sources[10]. On the whole their verdict, with all the necessary qualifications, is positive; but there are significant exceptions[11].

A.2) Statisticians. Usually they start from the "theoretical" problems of comparability of existing statistics or of the optimal criteria for compiling them. The list is very long: names that might be mentioned are Guyot, Lippert, Flux[12], and among the Italians, Bodio, Stringher, Coletti and Ricci[13]. Around the turn of the century four international congresses were held on the subject (14). Considerable attention was also devoted to the topic by other meetings, as the biennal conferences of the Institut internationale de Statistique (on the basis of reports by Bateman, the head of the British Board of Trade) (15) and the biennal congresses of the Chambers of Commerce (16). The last contributions of this group come from after the Second World War, by Petruzzelli and Allen & Ely (17). Subsequently the topic lost interest, owing to the resulted standardization of criteria adopted and to the publication by international organizations of already comparative tables.

II.- Standardization Efforts.

For many years, motions for a greater comparability were repeated by experts and congresses, but without practical results[18]. In fact the quality of trade statistics seems to have improved considerably, but for different reasons, the general improvement in official statistical output, and above all protectionism. This both encouraged custom checks and made the compilation and presentation of data more detailed and complex. Many minor countries improved their statistics, adopting the models of the most advanced countries. This did not however solve the problem of comparability, given the possibility of using radically different systems[19].

The failure of standardization efforts seems due to two factors:

- bureaucratic inertia to change established criteria.[20];
- fear that international agreements on trade statistics would tie the hands of governments in formulating protective tariffs.

Both factors pushed to drop the original idea of making all countries adopt the same criteria [21]. It had still inspired the 1900 Paris Conference[22], and was widely discussed at the 1908 Prague Congress of Chambers of Commerce; but the majority of speakers there recognized its impossibility in practice[23]. That congress did therefore formulate the "minimum" proposal to confine intervention to the classification of goods, leaving trade statistics otherwise unchanged. Two international conferences were called to draw up a standard classification; agreement was finally reached in Brussels in 1913[24]. It provided for the setting up of a "Bureau internationale de statistique commerciale", which was to publish a regular "Bulletin" containing data supplied by governments in accordance with a minimum list of 186 items.

The Brussels agreement was not practically implemented because of the outbreak of the war. The first Bulletin du Bureau international de Statistique Commerciale appeared in 1925 and published comparable international commodity statistics from 1922, extended in following issues to 1937. In the climate of post-war international cooperation, the XV session of the Institut International de Statistique (Brussels, 1923) prepared a new, more ambitious, plan of improving foreign trade statistics. It urged the generalization of the system of declared values, recommended precise definitions for weights and measures and offered definitions of special imports and exports, of nationalized goods and of improvement trade [25]. These resolutions were confermed in the following session of Economic Committee of the League of Nations in February 1924. Consistently, in 1924 the League of Nations published systematic tables of international trade by country and merchandise for 1913, 1922 and 1923[26].

The drive to improve the comparability of trade statistics culminated in the International Conference Relating to Economic Statistics which the League of Nations organized in Geneva in 1928. It paid particular attention to definitions and recommended practices in the following fields:

a. More accurate definitions of General and Special trade, improvement, repair and transit trade. It was agreed that special trade should be compiled alone or together with returns of general trade but showing separately re-exports of such imported goods [27].

b. It was agreed also to use the declared values (c.i.f. for imports and f.o.b for exports) for valuations, although official values were accepted as a complementary requirement for fiscal reasons [28].

c. Special attention was given to the problem of country record trade of provenance and destination. Improvement in the accuracy of import records of provenance in all countries was recommended so that the exporting country might from these records learn the export destination[29].

The relevance of this conference is due not only to the high number of partecipating countries (42) and the significance of the treated issues, but also to its practical results. It got the first effective agreement with regard to standardization of national records [30], which was made possible by the improvements already made in the standardization of national compilation in the prewar years[31]. The agreement of 1928 was also the starting point for further standardization. The most important contributions were made by the League of Nations. From 1935 to 1938 it published four volumes entitled International Trade in Certain Raw Materials and Food-stuffs by Countries of Origin and Destination[32]. The next step was the extension of this method to overall flows. In 1942 the League of Nations published The Networks of World Trade, the first example of what is now known as a matrix table of world trade[33]. It concerns all the 173 countries which then published statistics for the years 1928, 1935 and 1938. The study also deals with different methods of compilation, and makes an effort to reduce different national coverages and other discrepancies between the records of exporting and importing countries.

III. The "Theoretical" Problems

Many reasons can explain a divergence in data for the same trade flow in the trade statistics of the two countries involved. These may be divided into three types[34]:

A) Inevitable differences[35] arising between countries not bordering each other, because of the time and costs of transport[36]. These may emerge in recording amounts traded for various reasons: losses in transit (shipwrecks, etc.), changes in value of goods caused by changes in world prices, time lags because of length of voyage[37], change of destination during the latter[38]. To these should be added, only for values, the difference between the f.o.b. value of exports and the c.i.f. value of imports[39], equal to the cost of transporting and insuring the goods.

B) "Structural" differences in compilation criteria, which are by contrast eliminated by standardization. They concern mainly trade coverage, classification of goods into items, recording of goods values and indication of trading partners. There were two alternative models[41]. The first was adopted by Britain and the US (the "Anglo-Saxon model"), and the second by most European states (the "Continental model"). Every country followed one or other of these models, with more or less sizeable differences from the basic pattern[42]. An extended discussion of these issues is offered in Appendix B.

Though the biggest differences are among countries, differences can affect time series for the same country. More or less sizeable changes in compilation criteria and definitions were in fact rather frequent[40], for the most varied reasons (autonomous moves by statistical offices for "scientific" reasons, changes in customs systems, international agreements, frontier changes etc.). These changes brought inhomogeneities which in most cases cannot be corrected, but must nevertheless be borne in mind when reconstructing historical series.

C) Finally, there were actual errors, i.e. cases where data differed from the real flow. Three cases may be distinguished:

C.1) failure to record, because of smuggling.

This caused an underestimation of trade in both countries' statistics (thus making them unreliable), but not necessarily a difference between them.

Differences in statistics arose if the flow came from or went to a third country and was duly recorded there.

C.2) Inaccurate recordings following wrong declarations because of negligence or fraud.

These errors might concern either parameters of individual transactions (weight, value etc.) or their classification. The most important case seems to be entering consignments in transit as special trade (according to the "Continental" definition); this happened particularly for duty-exempt goods[44]. It resulted in an overvaluation of the country's trade and of world trade, and also a divergence from the statistics of other states[45]. Furthermore, in the case of ad valorem duties, traders had an obvious interest in declaring values below the real ones so as to pay less.

C.3) Errors by statistical offices.

They were concentrated in the estimation of official values. The most serious case was of course the omission to update them yearly: it would cause an overvaluation in time of falling prices or an undervaluation in times of rising ones. Errors could also arise, however, in the estimation of values, for instance because the use of domestic prices instead of international ones or failure to weight according to qualities or place of origin[46]. There could be also deliberate distortions: for instance rising the unit price of imports would give a false impression of lower nominal protection.

The percentage of errors was higher in records by country, undoubtedly the worst part of all trade statistics[47]. Declarations of traders about the origin and destination of goods were not reliable[48], and customs were interested in checking them only if differentiated tariffs by country were applied[49]. In general there was a tendency to overestimate the trade with neighbouring countries and correspondingly to underestimate that with countries further away; this bias was particularly serious for land transport. It is again likely that accuracy was greater on the import side, since here it was easier to ascertain provenance[50].

Some experts have attempted to evaluate the incidence of errors and the presence of systematic distortions by a priori arguments. It has for

instance been maintained that failing records were commoner the more liberal was trade policy, because of the absence of customs checking. For this reason, ceteris paribus it seemed likelier an undervaluation of exports and of imports of duty exempt goods (e.g. raw materials) [51]. On the other hand, the same flows were by definition not affected by smuggling and did not offer particular incentives to fraud. There were therefore two contrasting influences, so that it is hard to assess a priori the overall result.

IV. Reliability of Statistics

Overlooking theoretical literature it is possible to pick out only few works that test the reliability of trade statistics in a systematic way [52]. Ricci deals with world trade in grain for 1909, reconstructing the whole matrix of flows [53]. Through patient analysis, he succeeds in explaining almost all differences by errors of type A) and B). Lippert and Zuckermann compared the agregate trade statistics by pairs of countries [54]. Lippert considers only nine countries (for the decade 1891-1900), analysing the results and trying to explain the causes of differences. Zuckermann examines a broader sample of countries (thirty-seven) from 1909 to 1913, presenting results without comment. The more recent works by Morgenstern and Yehuda Don adopt the same method [55]. However, while Morgenstern is pessimistic [56], Yehuda Don does not rule out use of trade statistics. He considers more carefully the problems in comparability and suggests to analyze compilation criteria to choose the more reliable data [57].

Our test is designed to overcome the errors due to problems in the geographical assignment by comparing the total trade of a country according to its statistics with the sum of the same flows registered by foreign countries. So for every country we have estimated the following indexes of accuracy (58):

$$Mi = \frac{Mij}{Xji} \times 100 \qquad Xi = \frac{Xij}{Mji} \times 100$$

This ratio includes a transportation costs component, i.e. the difference between the c.i.f. valuation of imports and the f.o.b. valuation of exports. Differences between countries in the percentage of transportation costs over total trade value (the so called "freight factor") depend more on the commodity composition of trade than on its geographical distribution. The freight factor is higher the larger is the share of bulky commodities on total trade flows [59]. An estimation for every country would require such a quantity of information and calculation by commodity and geographical distance as to be unfeasible for so many countries over such a long period of time. So, drawing on already published work, in Appendix D we estimate an international freight factor for imports and exports for each benchmark as weighted average of eight country data. Despite the small number of countries, the sample is enough representative, accounting for more than 50% of the world trade. So we will use this factor to compute the indexes of a perfect "average" statistic (henceforth called "the norm") (60). However, differences in freight factors among countries were rather large (from 2% to 21% as shown in Table 1 of Appendix D). Therefore we will accept a larger interval of confidence for a "good accuracy" outcome (i.e. 80-100 for exports and 100-120 for imports).

In our test we employ Zuckermann's data for all the existing 19 European countries and for 15 non-European for the period 1909-1913 (61). This source gives for each country a network of trade (in francs at the gold parity) that covers at least 95% of its trade. For the years 1928 and 1935 the data came from the world-trade matrix elaborated by the League of Nations in 1942[62]. This work offers 173 national records of export and import flows by country of provenance and destination (thus, the network of trade representativity for every country is around 100%) in dollars at 1934 parity[63]. To maintain the homogeneity of the sample we have chosen for both periods the same countries (using Yugoslavia as Serbia and Austria as Austro-Hungary) considered in 1909-1913. This sample covers around 95% of world trade in 1909-13 and 90% after the war.

Country indexes are reported in Table 1 of Appendix A and plotted in Graph 1 .

Tab. 1

Statistical foreign trade accuracy indexes by groups of countries

	1909/13		1928		1935	
	X	CV	X	CV	X	CV
A. EXPORTS						
Industrial countries*.....	97.6	0.152	92.7	0.070	96.1	0.059
Non Industrial countries....	82.5	0.256 #	93.8	0.161	90.4	0.195
WORLD*.....	86.6	0.237	93.5	0.141	92.0	0.168
B. IMPORTS						
Industrial countries*....	117.1	0.170	108.3	0.115	112.7	0.095
Non industrial countries....	113.0	0.144	109.9	0.133	112.3	0.107
WORLD*.....	114.1	0.150 @	109.5	0.127	112.3	0.102

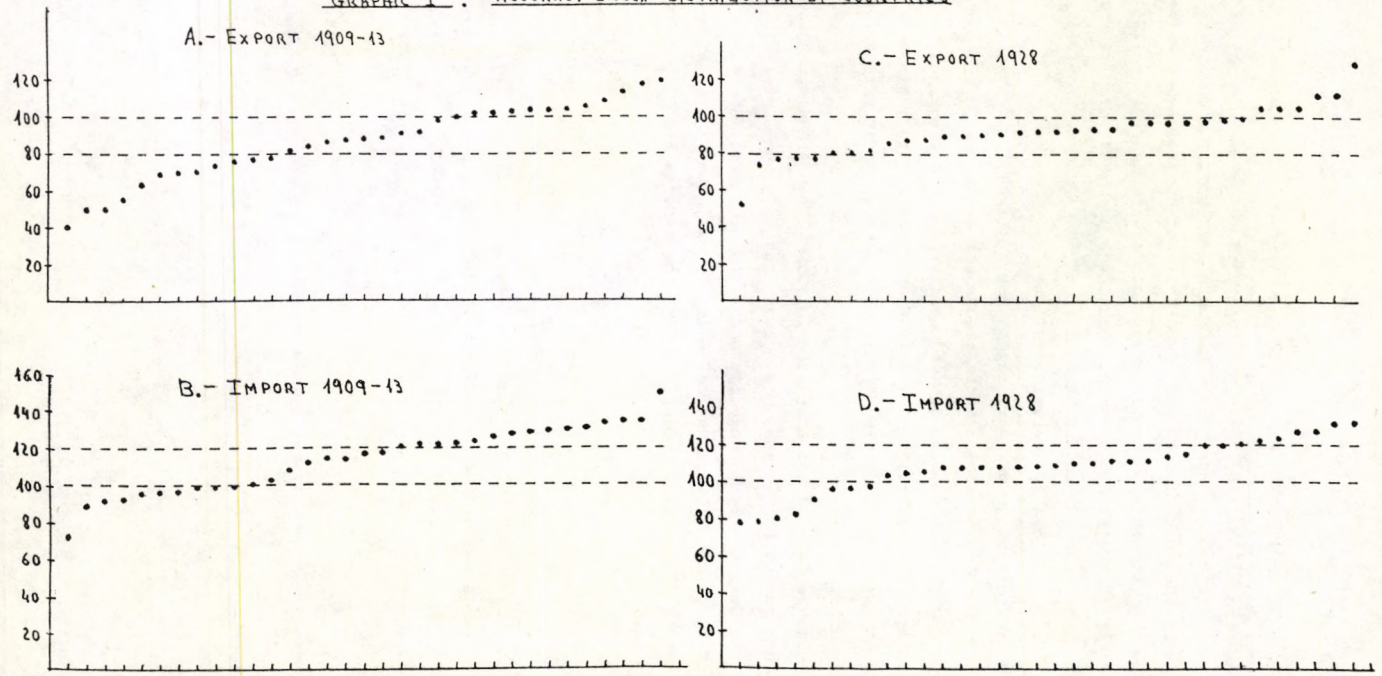
(*) Netherlands excluded (see pp.)

(@) Significantly different from the "norm" at 5%.(#) Significantly different from the "norm" at 10%

(X):aritmetic average; (CV): coefficient of variation.

Sources: See text and Appendix A.

GRAPHIC 1 : ACCURACY INDEX DISTRIBUTION BY COUNTRIES



Aggregate results reported in Table 1 are better than we expected. Averages for the whole sample (64) are -both for imports and exports- stable in time and close to the norms. The hypothesis of significative differences among values at the three benchmark years can always be rejected (65). It is also possible to reject the hypothesis that the averages are significantly different from the "norm" at 5% in five of the six cases (only imports in 1909-13 seem significantly overvalued).

In the same table we report separately averages for industrial and non industrial countries. It could in fact be assumed that a higher level of development might determine a better quality of bureaucracy and therefore a higher accuracy of statistics. However, averages are fairly similar between groups in the same year, and the distinction proves itself relevant only for 1909-13 exports.

Country indexes are rather scattered in 1909-13, as shown by the variation coefficients and by the number of cases outside our interval of good accuracy in Graph 1 (22 for exports and 24 for imports). After the war, the dispersion is clearly lower: the reduction in variance is significative (66) and the number of "outliers" declines to 9 for exports and 13 for imports.

Table 2

CORRELATION COEFFICIENTS.

	EX13	EX28	EX35	IM13	IM28	IM35
EX13	1.000	0.570#	0.576#	0.272	-0.101	-0.157
EX28		1.000	0.732#	0.124	0.214	0.138
EX35			1.000	-0.102	-0.143	0.074
IM13				1.000	0.524#	0.286
IM28					1.000	0.514#
IM35						1.000

(#) Significative at 1%

The matrix of Pearson coefficients (table 2) rules out the possibility that the intertemporal stability of averages is the causal result of erratic movements of country indexes. Coefficients are fairly high and highly significative between years, and low and insignificant between imports and exports in the same year(67). This last result seem to exclude that compilation criteria affected in the same way exports and imports for he whole sample, causing in both a systematic bias (i.e. an overvaluation or an undervaluation)

Previous discussion has suggested two possible causes to explain the dispersion of indexes, different compilation criteria and a different freight factor. The former cannot be assessed in quantitative terms, so an econometric analysis has to be restricted to the influence of the latter. As already said, the freight factor depends on the commodity composition of trade and more precisely on the share of bulky commodities on total flows. The higher is their percentage the higher should be the difference between cif and fob valuations and therefore the more distant the index from 100. This idea could be tested with the following regression:

$$INDEX = a + b\ BULKY + e$$

in which INDEX is our index of accuracy, and BULKY is the share of bulky commodities, with a predicted coefficient negative and positive for exports and imports respectively. We have tested the model with export indexes for 1909-13, the year with the higher dispersion. Data of BULKY have been computed from Yates and League of Nations for the year 1913 (68). It is a weighted sum of shares on total exports of the six commodities with the highest transportation costs. The weights are the freight factors (percentage of those costs on commodities value) reported by Moneta (69). We assume that proportion among freight factors of bulky commodities were similar across the time.

The model is tested also introducing a dummy (GROUP) for the level od industrialization, that has proven to be a relevant factor of differentiation at least for 1909-13 exports. It can be considered as a proxy for different qualities of the statistical service.

Table 3

BULKY COMMODITIES REGRESSION FUNCTIONS EXPORTS 1909-13

A/

1)INDEX = 96.99 - 4.56* BULKY R = 0.11 F= 5.04
n=33 (16.99) (2.25) SEE=19.33 DW=1.98

2)INDEX =100.01 - 7.07# BULKY R = 0.38 F=16.57
n=29 (21.80) (4.07) SEE=15.23 DW=1.81

B/

1)INDEX = 92.24 - 3.95* BULKY + 12.29 GROUP; R = 0.16, F= 4.008
n=33 (14.73) (1.98) (1.64) SEE=18.82 DW=2.33

2)INDEX = 94.36 - 6.52# BULKY + 14.71*GROUP; R = 0.47, F= 13.58
n=29 (20.14) (4.11) (2.64) SEE=13.78 DW= 2.53

(#) significative at 1%; (*) significative at 5%; t-statistics between parenthesis.

Results of the regression for the whole sample confirm that the freight factor as explicative variable: BULKY is always negative and significant at 5%, but in the simpler model (regression A.1) the R is rather low. The introduction of GROUP (B.1) raises it slightly. It is however possible to single out from an analysis of the residuals a small group of "outlying" indexes, that often can be explained by country specific considerations (N). Excluding only four small countries (Peru Portugal, Canada, Serbia) the level of significativity rises to 1% and the R to 0,36 (regression A.2). The introduction of the dummy (B.2) raises the explained variance to nearly half and the dummy itself is also significative. This result suggests that differences in the quality of statistics could be a relevant explicative variable.

Outcomes can probably be improved refining the freight factor index. However they strongly suggest to complete the aggregate analysis with case

studies. Only at a country level, infact, it is possible to pinpoint peculiarities in compilation criteria and/or defects of statistics that can explain the actual values of indexes. Here we will offer three examples.

Netherlands is characterized by an extreme overvaluation in 1909/13 (284 for exports and 218 for imports). It seems due both to the inclusion of transit (and transhipment) trade in the special trade accounts and to the use of an old system of fixed values (most of them not revised from 1846). In 1917 transit trade was excluded (through the imposition of a general ad-valorem duty on imports that excluded transit goods) and declared values were adopted[70]. These changes were effective: Dutch statistics in the interwar years show better outcomes suffering even from slight undervaluation.

Greece's indexes are clearly undervalued. This seems due to the out-of-date revisions of the official values used in the statistics before 1918. From then on official values were revised each year until declared values were introduced, first partially in 1921 and as a general system in 1926[71]. This change seem to be responsable of the remarkable improvement in the Greek indexes in 1928 and 1935. The same failure in annual revision of official values is shared by other non industrial countries (Argentina, Romania, Spain etc. [69]).

The import overvaluation trend affected both industrial and non industrial countries in 1909-13 and it could be explained by the inclusion of transit trade in special trade accounts and -for countries using official values- a tendency to overvaluate unit prices.

Low values for Germany and Great Britain in 1909-13 can be puzzling, because both countries are usually regarded as paradigms of accuracy[73], even if they used different methods of compilation. They can be explained at least partially by the distortions introduced into the test by the great overvaluation of Dutch statistics. Both countries had considerable bilateral trade with the Netherlands, but the German share was bigger [74]. In fact, if the Netherlands were left out of the test, both indexes would improve, but not in the same proportion (the German one to 119 for imports and 88 for exports, the British one to 98 and 78 respectively). The smaller

improvement in British statistics suggests the existence of other problems, such as differences in trade coverage definition or undervalued declarations by traders. The smaller size of Dutch bilateral trade makes this problem less relevant for other countries [75].

V. Conclusions

Foreign trade records have been widely used in economic history, because generally they are the oldest and most complete aggregate series in most countries. This widespread use implies a trust in their reliability that seems to be in contradiction with the results of the few empirical tests available to date.

The results of our tests are better than previous ones and would therefore support a positive verdict on the accuracy of international foreign trade statistics, at least during the first third of this century. It would seem, therefore, that the procedure adopted by Morgenstern led him to erroneous conclusions.

During the period analysed, the standardization of national trade compilation improved both the comparability and the accuracy of international trade statistics. From the relatively good starting-point of 1909/13 to the inter-war years, the accuracy index shows a net improvement which is mainly due to the introduction of more effective methods of compilation.

This work also maintains the usefulness of comparisons of international trade data for testing the accuracy of national records. However, even when aggregates present a good accuracy, comparisons between pairs of countries present special difficulties due to the generalization of errors in geographical assignment.

The existence of some "unavoidable" problems such as the failures in geographical assignment mentioned, the slight differences in trade coverage and the difficulties of estimating transport costs do not invalidate the comparison of different national trade records. Study of methods of compilation and of the efficiency with which they were applied thus remains indispensable for assessing the reliability of national trade statistics;

but the use of international comparisons would at least be useful to measure sign and dimension of the potential bias of national and international foreign trade statistics.

APPENDIX A

Table 1

ACCURACY INDEXES

	1909/13		1928		1935	
	Export	Import	Export	Import	Export	Import
Industrial Countries						
1.Austria	104	135	98	112	100	117
2.Belgium	105	97	78	78	97	94
3.France	106	123	99	112	100	115
4.Germany	78	93	88	115	96	124
5.Italy	109	130	92	109	91	107
6.Netherlands	284	218	78	83	82	92
7.Sweden	92	150	94	124	88	116
8.Switzerland	120	118	93	109	107	129
9.United Kingdom	77	93	98	108	93	108
10.United States	87	115	94	108	93	104
Non Industrial Count.						
11.Bulgaria	102	135	113	116	111	127
12.Denmark	86	122	98	132	96	122
13.Greece	50	73	88	104	86	110
14.Norway	70	129	90	128	85	116
15.Portugal	50	130	53	120	60	113
16.Roumania	64	115	83	123	84	99
17.Serbia	114	124	93	108	84	114
18.Spain	76	131	106	132	79	109
19.Turkey	71	101	87	98	94	98
21.Argentina	55	99	81	81	81	105
22.Brasile	104	128	98	120	84	116
23Cuba	100	99	94	106	94	102
24.Peru	102	118	130	121	131	121

(next page continue)

25.Uruguay	89	99	106	96	143	123
26.Canada	118	122	113	97	101	99
28.British India	82	109	90	111	87	108
29.Dutch India	40	89	81	110	76	128
30.Philippines	103	113	91	109	79	99
31.Japan	91	97	100	111	91	112
32.China	74	103	85	105	70	110
33.Morocco	88	126	75	91	84	119
34.Egypt	84	96	93	79	94	89
35.Australia	99	121	98	112	88	111

Sources: see text.

APPENDIX B.

Criteria for Compiling Foreign Trade Statistics and Structural Differences

1. The definition of foreign trade coverage had two aspects:

1.1. The definition of frontier from the customs point of view. This did not necessarily coincide with the political one because of the existence of free ports or of territories coming under special customs arrangements. Their trade in some cases was kept separate, or even left out from national statistics. This almost always caused a difference from the statistics of other countries which, on the basis of political frontiers, included it. Such differences could be sizeable for ports or territories of any commercial importance (e.g. Trieste and Fiume for Austria before 1891)[1].

1.2. The classification of the trade flow on the basis of the customs status of the goods and the reason for the frontier crossing. In theory, four main types of trade can be distinguished[2]:

- "special trade": movements of goods for consumption or processing in the country concerned (on import) or in foreign states (on export), not subject to special customs arrangement;

- improvement trade (also known as temporary trade): frontier crossings on a duty-exempt basis for the purpose of processing; following this the goods should return to the country of origin (e.g. in the case of temporary import, should be re-exported);

- entrepôt trade: flows from and to free ports or bonded warehouses, with or without change of ownership; these two were typically exempt from duty[3];

- transit: simple passage through the customs territory without any processing and without stopping.

Statistics compiled on the "continental" pattern had at least two classifications, special trade and general trade[4]. The latter included all flows across the frontiers, including (apart from exceptions) transit. The two smaller subdivisions (improvement and entrepôt trade) were treated

differently (included in special trade or not) by different countries. In the most accurate statistics like the German[5] or French ones, they were even recorded separately. This introduced a precision that was to some extent spurious, since the distinction was often not very clear in practice and left wide room for fraud and error[6].

Countries using the "Anglo-Saxon" model considered only one generic category of trade, excluding transit[7]. In theory, this ought to have been the same as special trade on the continental criterion, including improvement trade and stock changes in bonded warehouses. However, there were enough minor differences to make the correspondence inexact. In any case, none of the quoted statistical work [8]corrected or supplemented special trade figures in order to solve this problem.

It should finally be recalled that some particular trade flows (e.g. precious metals[9], gifts, postal packages[10], government property, etc.) were treated differently in different countries, with resulting differences in values recorded.

2. Classification of goods and details of data collection and presentation.

All the statistics presented data at two o more levels of aggregation, broader units and single items. The division according the economic criterion (raw material, semifinished goods, manufacturess and foodstuffs) was not of general use till the beginning of the XX century. Broader units (then called "categories") were grouped according different criteria, the most widely used being the raw material employed. Also single items were collections of goods with wide differences in composition and definition among countries and even for the same country in different years (11). In most cases they corresponded to tariff headings; therefore, the number was higher in protectionist countries (sometimes running into thousands) and for the most protected goods (12). Because of those differences, a straightforward comparison between single items was in practice very difficult, and sometimes faesible only for raw materials.

Less well known are the possible differences in other aspects of the presentation of the figures. These might concern the reference period (calendar year or tax year)[13], units of measurement (sometimes not mutually

convertible[14]), the treatment of tares[15] etc. Though generally of lesser importance, these differences may conceal traps for synchronic and diachronic comparisons, especially for single goods.

3. The recording of the valued of goods, which has three distinct aspects.

3.1. Treatment of transport and insurance costs.

The great majority of countries adopted the modern practice of taking the value of goods at their own frontier, including cost of transport, insurance and mercantile commisions (but not duties) in imports (c.i.f.) and excluding them from exports (f.o.b.)[16]. There were several exceptions[17], the most important being US statistics, which valued imports too at the country of origin (f.o.b.).

3.2. Assessment of unit value of goods.

In the "Anglo-Saxon" method the trader (or shipper) had to declare the total amount of the transaction, which could be checked by customs. This system presented a risk of fraud, because of the interest in understating values for fiscal or excise reasons where duties were ad valorem. It was the case in the USA[18], where the system of checks and declarations was officially very accurate or - according to traders - decidedly oppressive.

In the "continental" method, instead, the declaration was confined to the weight, and the unit price (or "official value") was established annually by government bodies, in general expert commissions[19]. The "official values" were initially employed to calculate exchanges at constant prices, but in the 19th century had become "a mere expedient aimed at avoiding some difficulties presented by use of the method of declarations"[20]. The method had two drawbacks: the need to make averages over often highly diversified "items"[21], and the difficulty of dealing with rapid changes in price[22]. These could be overcome by truly annual updates and with optimal organization of work by the commissions (wide enquiries to secure price lists and information, separate estimates for goods under each "item", etc.). The merits of both systems were the object of lively discussion, at least until the First World War[23]. Differences deriving from the choice of one or the other were however smaller the more accurately they were applied.

3.3. Choice of exchange rates.

This problem presents itself above all[24] in comparisons between statistics from different countries. In theory, in periods of fluctuating exchange rates such as the postwar years annual exchange rates ought to be used (25), whereas in fixed rate periods to use the same rate for several years is the most extended practice (e.g. gold parities during the gold standard period). The latter practice[26] may however create differences in comparisons between countries with devalued or nonconvertible currencies (at the time including, in various years, Italy, Russia and Austro-Hungary) and countries with gold currency. In fact, it causes overestimation of values reported in statistics from the former group[27].

4. Indication of Trading Partner

Two main criteria were in use to define the trading partner[28]. In the "continental" system the attempt was to indicate the actual one, i.e. on import the country of origin (the one where the goods had taken on the form in which they were presented at the frontier) and on export the country of destination (where the goods were to be consumed or processed). This method posed conceptual problems (of defining processing and consumption) as well as obvious practical difficulties. In practice, it was generally applied rather elastically, providing for indication of the country of first known shipment (embarcation on ship or rail) instead of that of origin, or the last one of arrival instead of that of actual destination, where unknown. The "Anglo-Saxon" system adopted the criterion of the country of consignment, defined as that of departure or arrival of the goods as indicated on the shipping documents. In the majority of cases there was an attempt at identifying at least the country where the voyage had begun or would finish (actual consignment). Accordingly, practice did not depart too much from that adopted in the previous case. A more rigid definition (direct consignment) was however possible, and was used by British statistics until 1904. These indicated the country where the goods had been embarked or would be unloaded. In this way reliable recordings were secured, though at a high price in terms of the comparability and usability of the figures. The criteria in fact by definition eliminated exchanges between Britain and

countries without a sea coast (including Switzerland), and produced grave distortions in the distribution of trade flows by country[29]. Following protests by operators, from 1904 onwards the criterion of actual delivery was adopted[30].

APPENDIX C

Directory of compilation methods in different countries.

This Appendix lists briefly the main criteria used by countries in our sample in 1913 and in 1928; they are drawn from the Memorandum of the League of Nations[1]. It is possible to identify changes by comparing them. In 1935 there were no further changes, except for a shift to declared values in Spain after 1931.

The first column is a general indication of the method used (A Anglo-Saxon, C Continental). Others specify the criteria for values (O Official - Oa Antiquated official, D Declared, M Mixed), transportation costs (c.i.f., f.o.b. etc.) and country registration (Co Consignment - both for imports and exports, Or = Origin and Pu = Purchase for imports, Des = Actual destination or consumption and Sa = Sale for exports).

1913		IMPORT			EXPORT		
Country	Sys	costs	val2	coun	costs	val	coun
Austria	C	cif	O	Or	fob	O	Des
Belgium	C	cif	O	Co	fob	O	Des
Bulgaria	C	cif	D	Co	fob	D	Des
Denmark	A	cif	D	Pu	fob	O	Sa
France	C	cif	O	Co	fob	O	Co
Germany	C	cif	O	Or	fob	D	Des
Britain	A	cif	D	Co	fob	D	Co
Greece	C	cif	Da	Co	fob	Oa	Des
Italy	C	cif	O	Or	fob	O	Des
Netherlands	C	cif	Oa	3	fob	Da	4
Norway	A	cif	M	Pu	fob	O	Sa
Portugal	C	cif	D	Pu	fob	D	Co
Roumania	C	cif	O	Co	cif	O	Sa
Russia	C	fob	D	Co	fob	D	Co
Sweden	c	cif	O	Pu	fob	O	Sa
Switzerland	C	cif	M	Or	fob	D	Des
Serbia	C	cif	D	Co	fob	D	Des
Spain	C	cif	Oa	Or	fob	Oa	Des
Turkey	C.	cif	O	Co	fob	O	Co
Egypt	C	cif	M	Or	fob	O	Des
Marocco	-	-	-	-	-	-	-
Argentina	C	cif	Oa	Or	fob	O	Des
Cuba	A	fob	D	Or	fob	D	Co
Brazil	A	cif	D	Or	fob	D	Co
Peru	C	cif	OA	Co	fob	O	Co
Uruguay	C	cif	Oa	Or	fob	Oa	Des
USA	A	fob	D	Co	fob	D	Des
Canada	C	fob	D	Co	fob	D	Des
British India	A	cif	D	Co	fob	D	Des
Dutch India	A	cif	O	Pu	fob	O	Sa
Philippines	-	-	-	-	-	-	-
Japan	C	cif	D	Or	fob	D	Des
China	C	cif	D	Pu	fob	D	Co
Australia	A	fob5	D	Or	fob	d	Des

1 League of Nations, Memorandum.., cit.
2 Cases with mixed systems: Norway about 60% official values; Egypt over 50% official values
3 By land: contiguous, by sea: shipment
4 By land: continguous, by sea: shipment
5 With a 10% increase

1928		Import			Export		
Country	Sys	costs	val6	coun	costs	val	coun
Austria	C	cif	D	Or	fob	D	Des
Belgium	C	cif	D	Co	fob	D	Des
Bulgaria	C	cif	D	Or	fob	D	Des
Denmark	A	cif	D	Pu	fob	D	Sa
France	C	cif	D	Pu	fob	O	Co
Germany	C	cif	D7	Or	fob	D	Des
Britain	A	cif	D	Des	fob	D	Des
Greece	C	cif	D	Co	fob	D	Des
Italy	C	cif	D	Or	fob	D	Des
Netherlands	C	cif	D	Co	fob	D	Des
Norway	A	cif	M	Pu	fob	D	Sa
Porgugal	C	cif	D	Pu	fob	D	Co
Roumania	C	cif	O	Co	fob	O	Sa
Russia	C	cif	O	Co	fob	O	Co
Sweden	C	cif	M	Pu	fob	D	Sa
Switzerland	C	cif	D	Or	fob	D	Des
Serbia	C	cif	D	Co	fob	D	Des
Spain	C	cif	O	Or	fob	O	Des
Turkey	C	cif	D	Co	fob	D	Co
Egypt	C	cif	M	Or	fob	O	Des
Morocco	-	-	-	-	-	-	-
Argentina	C	cif	O	Or	fob	O	Des
Brazil	A	cif	D	Or	fob	D	Co
Cuba	A	fob	D	Or	fob	D	Co
Peru	C	fob9	D	Co	fob	Mix	Co
Uruguay	C	cif	O	Or	fob	O	Des
USA	A	fob	D	Co	fob	D	Des
Canada	C	fob	D	Co	fob	D	Des
British India	A	cif	D	Co	fob	D	Des
Dutch India	C	cif	O	Co	fob	O	Co
Philippines	-	-	-	-	-	-	-
Japan	C	cif	D	Or	fob	D	Des
China	C	cif	D	Or	fob	D	Des
Australia	A	fob8	D	Or	fob	D	Des

6 Mixed systems Norway and Egypt as in 1913
7 From September 1928; previously mixed
8 With a 10% increase
9 With a 20% increase

APPENDIX D
International freight factor stimation.

Table 1

	1909-13		1928		1935	
	EXPO	IMPO	EXPO	IMPO	EXPO	IMPO
U.S.A.(1).....	4.9	2.9	4.0	2.9	4.7	3.4
U.K.(2).....	12.2	6.6	7.9	5.3	7.8	6.3
FRANCE(3).....	3.3	6.3	2.5	4.9	2.6	5.9
GERMANY(4)....	12.0	8.7	8.7	6.9	10.4	15.3
CANADA(5).....	-	8.1	-	7.2	-	9.3
JAPAN(6).....	3.3	4.2	2.2	3.1	2.7	2.4
ITALY(7).....	4.0	15.2	7.7	10.2	4.0	10.8
SPAIN(8).....	18.8	11.6	13.4	12.5	21.2	14.8
TOTAL WEIGHTED(9)...	8.5	7.1	5.4	5.4	6.0	7.5
TOT. WEIGH. + INSURANCE(10)..	9.7	8.3	6.4	6.4	7.0	8.5
(%) ON WORLD TRADE...	53.3%	54.9%	52.2%	52.9%	48.4%	51.2%

Sources and procedures in footnotes.

The derivation of a country freight factor serie requires the recognition of the fact that changes in an average freight ratio are the result of changes of prices of exported and imported commodities and changes in the freight rates. If freights and prices index are correctly weighted to take account of changes in the relative importance of various bulky commodities in every country, changes in countries commodities composition would not affect the reliability of the freights factors derived.

Table 1 has been estimated taking exports and imports freight factors for single countries in selected years from publications and procedures mentioned in the table attached figures. These percentage were then applied to the common serie of Industrial European Freight price index of Kindlebergerweighted by the corresponding country export and import price indexes. As already mentioned, the common Industrial European freight index used in table 1 for every country might not be sensible for any change in the single countries bulky commodities share.

Nevertheless the sample is biased in favour of the industrialized countries. Moneta's study has shown the existence of a high correlation by commodity groups between freight factors and unit values(10). This fact might suggest that the exclusion of most primary producer countries(some important exporters of bulky commodities) would produce a certain undervaluation of the international export freight factor. So it is difficult to advance a priori if the introduction of low unit value primary commodities(as wool, cotton, coffe, cocoa and spices) would compensate

those of the high value primary commodities(ores, fertilicer, coal, timber, petroleum). A first impresion given by the imports freight factors of the industrialiced countries(which would represent a sample of primary products pluss some manufactures) offered in table 1 is that this compensation may exist.

Footnotes Appendix D.

(1) Simon (1960) (using North's figures) offers a 7.1 and 3.9 per cent as exports an imports freights factors for U.S.A in 1900. For 1928 were applied the ratio given by the In dustrial European freights index and the corresponding U.S.A export and import price index from U.S. Department of Commerce (1975)
(2) Feinstein(1972). shows in p.119 and exports and import freight factor for U.K. in 1936 of 8.6 and 8.3 per cent respectively. For 1935, 1928 and 1909-13 we have constructed the same ratios than for U.S.A. using U.K. export and import price index from Feinstein(1972), p.T.139.

(3) Levy Leboyer (1977) suggest a 3.o and 5.4 per cent as freight factor for export and import of France 1901. France export and import price index from Levy Leboyer(1970) pp.108-109; and Annuaire (1966)p. 360.

(4) Moneta,C.(1959), T.67, pp. 41-58, makes an accurate estimation of the German import freight factor in 1951 of 14.3 per cent. For exports we have estimated a freight factor of 14.5 % in 1951 using a sample of 26 freights factors of imports products (from Moneta according S.I.T.C.) weighted according 1951 German export commodity composition(from U.N.(1952) . Exports and import price index from Kindleberger (1954) p.229, U.N.(1956).

(5) For Italy freight factors series used by Tena,A.(1988). For Spain from Tena, A.(1985).

(6) Moneta, C, (1959), p.55, offers a revision of the J.Viner(1924) estimation of the Canadian import freight factor for 1907 of 6.9%. Price index used the already mentioned U.S.A. export price index.

(7) Buba, M.-Tatemoto,M. (1968) p. 193 offers freight factors for Japan 1892 of 5.9 and 7.9 per cent for exports and imports respectively. Price index from Ohkawa, K.-Shinohara (1979)

(8) Single countries freight factors weighted according their respective export and import world trade share offered for 1913 in Yates (1959) and for 1928, 1935 in League of Nations (1942)

(9) Simon,M.(1959), pp.659-660 offers an insurance charge stimation of 1.2 and 1.3 for U.S. exports and imports in 1900. Moneta(1959) considers tha

insurance charge at least by shipping "are usually stated as a fixed percentage(0.5%) of the value of goods", p. 54. We have assumed, following Simon, an estimation of 1.2% of insurance charge in 1909-13 and a light smaller percentage of 1.0% for 1928,1935. This reduction would came from the decline in maritime insurance rates because the remained trend to shift from sailing to steam vessels (following again Simon's assumption).

(10) C.I.F. - F.O.B. ADJUSTMENT FACTORS FOR GERMAN IMPORTS 1951

Commodity division	Unit value(dollar per metric ton)	Freight factor (per cent)
Ores	15	37.6
Fertilizer	20	34.2
Coal	22	53.2
Crude petroleum	25	64.3
Petroleum products	50	30.0
Cereals	90	16.8
Fruit and vegetables	145	15.8
Sugar	170	10.5
Chemicals	265	5.2
Paper	270	3.6
Stell mill and metal products	600	2.1
Hides and skins	950	4.1
Rubber	980	3.4
Coffe, tea, cocoa, spices	1100	2.1
Tobacco	1130	0.9
Machinary	1915	0.9
Textile thread and fabrics	2240	1.2

Sources: Moneta,C.(1959), Table 6, p.53

(11) Kindleberger (1956)

FOOTNOTES

1.The best work published on the topic is R.G.D. Allen and J.E. Ely (1953) For a very recent study see: Blades-Ivanov (1985). See also the introduction to International Monetary Fund (1969-1975). About the discrepancies for post Second-World-War statistics see: Ely (1961)pp. 23-26. Yeats (1978) pp. 344-361. Kostecki-Tymowsky (1984) pp. 197-201.

2. Morgenstern (1963)pp. 164 and 180.

3. See Y. Don (1968) esp. pp. 91-92. Platt (1971) pp. 119-130. An earlier explanation of the causes of these disparities is offered in E.D. Duran "Country Classification", in Allen- Ely (1953) esp. pp. 18-19.

4. This method has been discussed in A.Tena (1988). The same idea has been used in the reconstruction of the Belgian (Degreve 1982) , Spanish (Tena (1985) Prados de la Escosura (1986)), and the Ottoman Empire (Pamuk 1987) historical foreign trade serie

5. For data see Appendix A.

6.It was the so called "consignment method", that Britain applied in a very strict sense. See Appendix B for details.

7. See Ministero di Agricoltura, Industria e Commercio (1866) pp. 90-91.

8. The differences emerge fairly clearly. For instance, heads of statistical offices obviously trusted the quality of statistics more than private scholars; the representatives of each nation (particularly civil servants) tended to defend the criteria employed; finally, one has the impression (though hard to prove concretely) that the verdict is more favourable the more the figures support the author's (free trade or protectionist) thesis.

9. Bourne (1872) pp. 196-217 and Giffen (1882)pp. 181-284.

10. Confining ourselves for simplicity to comprehensive works, fairly full discussions of the topic, with corrections of the most flawed figures, are given by C.P. Kindleberger(1956), Yates (1959) and Lewis (1981)pp. 25-73; there are much more summary treatments in Hanson (1980) Bairoch-Etemad, (1985) and Maizels (1963)

11. E.g. Tena (1985), and Prados, (1986), reestimate spanish statistics using prices and total trade coming from foreign ones; S. Pamuk (1987), uses altogheter the foreign statistics in place of the Turkish ones.

12. Flux (1923) pp. 297-315, Lippert (1903) and Guyot (1909)

13. Bodio (1896) and Stringher (1896)pp. 78-105 and Coletti (1903) Ricci (1914), pp. 337-412.

14. See Congres (1894), Congres (1898), Exposition (1900) and Congres (1905)

15. His reports are published under various titles in the "Bulletin de l'Institut international de statistique", which also contains other articles on the topic.

16. For the proceedings see Congres (1908), Troisieme Congres (1908), Quatrieme congres (1910), Fifth international congress (1912)

17. Petruzzelli (1946),and Allen- Ely (1953).

18. See the account of those efforts in Trendelenburg (1927)

19. See Appendix B.

20. Sometimes the criteria were defended by representatives of various countries on "theoretical" grounds; cf. the discussion in the Trade Statistics Committee of the Institut internationale de statistique at the Rome Congress between Bateman, De Foville and Ferraris Congress (1887).

21. For an impassioned account of this scientific project, see Bateman (1887)pp. 294-298.

22. Exposition (1900)

23. See Troisième Congrès (1908)

24. Cf. Conference (1914)

25.League of nations (1924a)

26. League of Nations (1924b) Afterwards, these tables were published yearly with supplementary addition of countries and analyses of national compilations. In 1933 the title of the publication was changed to International Trade Statistics.

27. The Conference dealt also with the classification of goods, appointing a Subcommittee that prepared a Draft Customs Nomenclature (published in 1931 and in a revised form in 1937). It contained 991 items arranged by 21 major sections with 86 divisions. Pending the classification by nature of material, in 1938 a Minimum List presenting a more limited number of items was published. In general the Brussels commodity classification and the Draft Customs Nomenclature influenced national commodity classifications and furthermore facilitated the introduction of the Standard International Trade Classification (SITC) promoted by the UN

after the Second World War. For all these issues, see V.S. Kolesnikoff, "Commodity Classification" in Allen-Ely (1953) pp. 51-81.

28. See William R. Leonard, "International Comparisons and Standardization" in Allen-Ely (1953) pp. 246.

29. It is generally thought that the geographical origin of imports is easier to assess than the destination of exports. Between 1931 and 1933 an experiment was done for 26 commodities, aimed at reconstructing their world matrix. The conclusions of this work were pessimistic about the possibility of associating imports records and exports records for the same goods. This seems to hold true no matter what methods were used to determine provenance and destinations. A full account of this innovative work is given in League of nations 1933) .

30. League of Nations (1929). The treaty was signed by 29 countries and the Final Act (that included only recommendations) by 37.

31. Main changes in national compilation from 1913 to 1926 are listed in Appendix C.

32. League of Nations (1935-1938). It considers 38 commodities, using physical units to avoid value conversion problems. This publication gave a more positive view of the results of the experimental work conducted in 1931-1933. (see footnote 29).

33.League of Nations, (1942).

34. What follows (and Appendix B) is an annotated summary of the articles cited in previous footnotes. For obvious reasons of space, it is not possible to consider individual national cases other than as examples.

35. For a particularly accurate list, see Ricci (1914), pp. 337-412.

36. These should not arise between neighbouring countries since the frontier crossing is contemporaneous (and without transport costs).

37. This by definition brings about a discrepancy in annual statistics if departure and arrival happen in different years; obviously the error is even larger for monthly or quarterly data.

38. There was in fact a possibility of so-called exports "on order", with the ship's captain being notified of the port of destination only at the last moment. This practice was very widespread in transoceanic trade in raw materials, so much so that Argentinian statistics recorded them separately.

39. This is the most common criterion for dealing with these costs; cf. Appendix B below.

40. For a list of those that took place in the statistics of the major countries before 1913 see Report (1904) pp. 442-446, and for later ones see Appendix C below.

41. For a clear list of the differences see Llewellyn Smith (1904),

42. For an outline of the criteria adopted by the various countries see Bateman's articles and Institut internationale d'agriculture (1914) According to one survey (League of Nations (1924) pp. 12-14) in 1913, 23 countries followed the Continental method and 11 the Anglo-Saxon one; in 1939 (Petruzelli (1946) p. 21) the two figures had risen to 43 and 35 respectively (with 5 cases of mixed methods).

43. Cf. Appendix B below.

44. For Italy cf. the examples given by B. Stringher 1896. The problem seemed to be particularly serious for transit countries like Belgium (cfr. D. Degreve 1982 p. 142) and Netherlands (cfr. infra).

45. Consider the case of an export from A to C via B (with all three countries using the Continental system). It would have to be recorded as special trade in A's statistics (as an export to C) and C's (as an import coming from A); in B's figures it should appear only under general trade, as transit (entering from A and exiting towards C). The error considered involves a double entry under B's special trade, both in imports (from A) and in exports (to C). This would mean the same flow being counted twice (e.g. in exports as both from A and from B), with a consequent overvaluation of world trade. Moreover, the total value of exports from B to C and of imports from A to B would be higher according to B's statistics.

46. The existence of differences in prices of traded commodities might be disputable on the assumption of a perfect world market. They can be explained by several reasons, beisdes market imperfections: differences in quality, effect of duties, different costs of untraded commodities etc.

47. For this reason Degreve (1982 p. 70-71) opts to confine himself to aggregate figures, completely ignoring those by country.

48. Cf. Kebers in Exposition (1900) p. 53.

49. A typical case of their effects can be found in the Italian statistics. Before the start of the customs war with France, these tended to overestimate trade with France (including transit to and fro other countries). After 1888 the opposite effect arose - a part of the French goods were declared as of Swiss or German in origin in order not to pay the higher duties Cfr. Annuario (1900)..

50. This hypothesis is the basis for the suggestion, often repeated by international organizations (most recently OECD (1985)), to use import data in country-to-country comparisons.

51. In some cases this brought about a revaluation of export figures by applying coefficients estimated by experts. The Italian Central Statistical Institute proposes an increase of 10% for the years up to 1919 (cf. ISTAT (1927); for France White (1933) pp. 42-43, increases imports by 3% and exports by 10%.

52. Many of the already quoted works illustrate their poins with scattered examples; cfr. also Guyot (1894) and De Cassano (1894)pp. 29-34.

53. Ricci (1914)

54. Lippert (1904) and Zuckermann (1921).

55 Morgestern (1963)and Don (1968).

56. Cf. p.1 above. He mentions some structural causes of difference (e.g. different classification), quoting also Allen and Ely' book, but omits others (such as trade coverage and recording by country).

57. Don (1968) pp. 91-92.

58. The test statistic for pairwise comparison between countries (used by Morgenstern) is:
M = (Mij - Xji / Mij)x 100; X = (Xij - Mji / Xij)x 100. He finds differences of the order of 50-60%.

59. "It follows that the differentiation between freight factors of imports of the same commodity from different countries is significant only when low valued commodities are considered" Moneta (1959) p. 51). Similar results are offered for the case of the U.S.A. by Yeats (1978).

60.The "norms" are:

	1909-13	1928	1935
export	90	93	91
import	108	107	108

The use of a 10% figure as a c.i.f.-f.o.b. adjustment factor is a common procedure; cfr. U. N. (1949). For a more reliable hypothesis against the estimation of a "freight factor" see C.P. Kindleberger (1956), pp. 336-340.

61. S. Zuckermann, (1921). For the list of countries and the division between industrial and non industrial countries (according the League of Nations classificatione) see Appendix A. The five-year data for 1909-13 is - for the 8 main countries- very close to (and never significantly different from) the annual average, and therefore its use does not affect results in a relevant way.

62. League of Nations (1942).

63. For 1928 the source reports also figures in dollars at the old (1913) parity.

64. Netherlands is always excluded because of the extreme overvaluation of its indexes in 1909-13 (cfr. infra). Indexes for other countries have been computed also excluding altogether trade with Netherlands from the matrix. Aggregate results (available at request) are very similar (for an example at a county level cfr. infra).

65. The heteroschedasticity of the average (cfr. infra) reinforces this conclusion.

66. The test rejects the null hypothesis of homoschedasticity at 2% for exports and 5% for imports.

67. The only exception is the correlation between 1909-13 and 1935 for imports.

68. Yates (1959) and League of Nations (1927); for Portugal data from Lains (1986) , p. 395.

69. Moneta (1959). The commodities are (freight factor between parenthesis): petroleum (64.3%), coal (53.2%), minerals (37.6), wood and timber (24.8%), cereals (16.8%), fruit and vegetables (15.8%).

70. League of Nations (1928), pp. 527-533.

71. League of Nations (1928) pp. 374-377.

72. As is well known, international prices declined during the great depression of the 1880s and rose afterwards (Great Britain's export prices index goes from 118 in 1845-47 to 92 in 1909-13). This would explain part of the overvaluation of Dutch statistics produced by a system of prices not revised from 1846. On the other hand, the increment of prices between the second half of the 1890s and 1913 (Great Britain's import price index grew from 69 in 1895-97 to 83 in 1911-13) would produce a tendency to undervaluation in statistics with values not regularly revised.

73. German statistics seem to present problems only for the years prior to 1880. Since then, the accuracy in the distinction of special trade from other trade flows and a meticulous annual estimation of official values differentiated by countries and revised annually rendered them among of the most accurate in Europe. On the other hand, British statistics followed the Anglo-Saxon method of compilation, but also present an accurate record of re-export and at least from 1871 an accurate system of declared values.

74. According to German statistics the share of Netherlands exports and imports was 3% and 7% respectively; according to the Netherlands records, those percentages would increase to 32% and 18%. For the British case the same percentage would be 3% for both export and import in British records and 9% and 6% for the Dutch ones.

75. The only exception is Belgium which, with Germany and the United Kingdom, was one of the biggest trade partners of the Netherlands (with import and export shares of 7% and 9.6% according to Belgian statistics and 20% and 28% according to the Dutch ones). Belgium's index without the Netherlands improves for import results and increases the overvaluation already detected in exports, a fact that is probably closer to reality.

FOOTNOTES
APPENDIX B

1. Don (1968) p. 87.

2. In fact, as the treatment by A. Maizels "Coverage", in Allen-Ely, (1953)pp. 44-49 shows, no less than 11 possibilities existed.

3. The object of this operation was in fact to put the goods on sale but without subjecting them to payment of import duties; if they found a purchaser they became "nationalized", moving to the category of "special trade".

4. The main exception was Russia, which published only general trade with transit, the figures for which were obviously higher than those for the special trade of other countries Lippert (1903)

5. These had an intermediate classification, namely "effective" trade, equal to general trade not including transit; this was closer to trade on the definition of the "Anglo-Saxon" method. On this point see Coletti (1903) pp. 13-52.

6. In this connection there are very intricate cases involving the continual disputes between commercial operators and customs officials regarding the recognizability of products after processing and the very concept of processing (e.g., to what extent did a change of packaging constitute processing?).

7. British export statistics, however, distinguished British products from re-exported foreign ones. Other types of trade (improvement and entrepot) were considered only by protectionist countries' statistics, that were usually compiled with the "continental" method.

8. See below.

9. These had a twofold role as a raw material for industry and as a means of international payment, making it hard to classify them. The most frequent solution was to treat coins and gold (more rarely silver too) in bullion or dust in a separate category which could easily be subtracted.

10. These could have some economic importance: for instance in France they were used to ship high-value goods like clothes and silks, but up to 1904 were valued at the low price of 15 fr./kg. Lippert (1903, p. 127) states that it was just this undervaluation of postal packages which was the official explanation for the divergence in valuation of French exports to Germany between the German and French statistics; however, he finds it insufficient.

11. Changes in classification were fairly frequent, especially when customs tariffs were changed; for instance for Italy, radically different groupings were adopted in 1886, in 1887 and in 1921, and there were frequent minor adjustments.

12. For instance, in the Italian case, there were, in the classification adopted in 1906-21, no less than 133 "items" for cotton tissues, as against only 19 for silk ones.

13. The most important case is the United States: until 1894 statistics referred only to tax year; afterwards it was published also a summary table by calendar year.

14. The simplest case was conversion between measurement by weight and by volume (e.g. for grain quintals and hectolitres), for which a coefficient of specific weight is sufficient. It might be the case, however, that conversion required more arbitrary assumptions about such characteristics as average weight (where figures were given by weight and by number of pieces) or even value (where only this was indicated).

15. All in all, there was a trend to move from gross weight to net weight, whether legal weight (tare predetermined officially for each type of goods) or actual, raising the problem of defining "packages constituting an integral part of the goods" (e.g. bottles for wine). The problem might be far from negligible: for instance, the average tare for Asiatic silks was 7%.

16. It should be noted that use of the same official value for imports and exports implies either undervaluation of the former or overvaluation of the latter (unless there is a difference in value equivalent to the costs of transport and insurance).

17. Petruzzelli (1946) p. 131, lists no less than 9 alternative criteria.

18. Lipsey (1963) p. 91-92) cites a 1939 survey according to which 60% of a sample of 12,000 declarations proved to be wrong. The author assumes that errors balanced out.

19. The records of such commissions represent sources of considerable interest for analyzing trends in the world market (e.g. in Italy the Commissione Centrale dei valori delle dogane (various years), in France, Ministère de commerce (variuos years)

20. Ch. De Lannoy, Rapport in Congrès (1905) p. 3.

21. According to some writers, the experts consulted and the commissions themselves tended to give more importance to prices for more recent months instead of weighting them according to the volume of trade

flows. See the detailed and perhaps ungenerous criticism of the Italian figures by C. Ottolenghi (1911) pp. 597-610.

22. Businessmen complained greatly of the impossibility of having monthly figures with updated prices, because of the need to wait for the end of the year in order to apply the commission's work. This problem must be borne in mind if one wishes to use monthly statistics, while it is obviously irrelevant for annual ones.

23. Cf. e.g. the debate between A. Julin and Ch. De Lannoy at Mons in Congrès (1905). Experience of post-war inflation in particular tended to make experts prefer the method of declaration.

24. Problems of choice could arise also if there were multiple exchange rates for the same country.

25. The use of average annual rates implies the assumption of uniform distribution of trade over the course of the year. This may not be true (e.g. trade in agricultural products may be bigger after harvest), and in such cases more detailed weighting would be called for.

26. It is adopted by Zuckermann, whose work however covers years of almost universal observance of gold parities.

27. Lippert stresses greatly the importance of this source of differences (1904).

28. There existed a third possibility, the method of purchase and sale, which favoured the financial transaction aspect. This was however used by only a minority of countries (especially Scandinavian ones).

29. These are easy to guess at (overvaluation of trade with France, Belgium and Holland and undervaluation of trade with European countries further away), but need to be stressed given the frequent use of British figures to correct those from other countries. Lippert (1904, p. 126) calls them more shipping statistics than trade statistics.

30. For an estimate of the effects of the change in method, see Board of Trade (1907).

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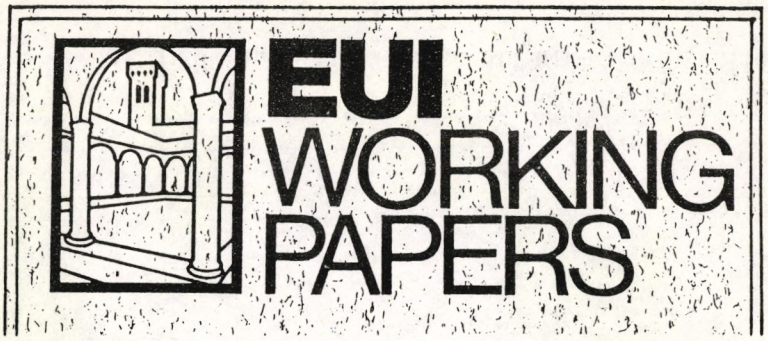

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